OUR ASTRONOMICAL COLUMN

AN ASTRONOMICAL BIBLIOGRAPHY.—We are somewhat late in drawing attention to a prospectus of what must prove a very important work in astronomical literature, if it is carried out with the care and completeness of which there is every promise. MM. Houzeau and Lancaster, respectively the director and librarian of the Royal Observatory, Brussels, have projected a "Bibliographie générale de l'Astronomie, ou Catalogue méthodique des Ouvrages, des Mémoires et des Observations astronomiques publies depuis l'Origine de l'Imprimerie jusqu'en 1880," and it is clear from the particulars furnished in the prospectus that the design has been thoroughly considered and formulated.

It is intended to divide the work into three sections :—(I.) *Ouvrages* or separate publications; (II.) Memoirs; (III.) Observations. For the first section there are available the astronomical bibliographies of Weidler, Scheibel, and Lalande referring to what may be termed the ancient period. For the modern the authors have made use of the catalogue (1860) of the splendid astronomical library of the Imperial Observatory of Pulkowa, and the catalogues of other observatories; more than a thousand journals and catalogues of different countries have been consulted for this division of the work. A list of the principal astronomical manuscripts, not yet published, which are found in the inventories of the various European libraries is added. Bibliographical notes, as, for instance, notes upon changes made in successive editions of a work are also appended, as well as a kind of analysis of works of an encyclopædic character. An alphabetical table of the authors and a methodical table of analysed matters accompanies this part of the work.

The second section, as forming a more immediate desideratum, it is intended shall be the first published, and the first fasciculus was about to be placed in the printer's hands, when the prospectus was issued, the others to follow rapidly. All the collections where astronomy could enter were consulted for this division, either directly or through the catalogue of scientific papers issued by the Royal Society or the *Repertorium Commentationum* of Reuss; it is mentioned that recourse has been had to the publications of nearly three hundred scientific societies, and more than a hundred and sixty reviews or journals. The authors have exercised great care in the classification of the contents, and in attributing each memoir to the sub-section to which it appertains; the collection where each memoir is found is indicated by a system of abbreviations. An alphabetical table of authors, briefly noting their different works for more ready reference, accompanies this second part also. In this division astronomical physics are included,

In the Section III., *Observations*, it has been proposed to arrange a kind of general table of observations, nearly upon the plan of the indexes to the *Astronomische Nachrichten*, but rather taking for a model the *Repertorium der Cometen-Astronomie* of Carl. In this section are mentioned the sources for observations of spots, faculæ, and protuberances of the sun, in chronological order from their respective discovery, observations of solar and lunar eclipses, each separately, monographs of the asteroids, bibliographical monographs of the comets, star catalogues, calculations relating to the compound stars, and individual descriptions of the variable stars and nebulæ. The authors claim to have analysed the publications of the different observatories with the most scrupulous attention in order to render this part of their work as complete and as useful as possible.

The entire work will form three large octavo volumes in double column, which will appear by fascicules of 300 to 400 pages; specimens of the form of execution of the three divisions of this laborious work are attached to the prospectus. It appears to be intended to issue it in sheets of sixteen pages, or thirty-two columns, at the price of three pence per sheet, payment to be made for each fascicule.

Every astronomer and astronomical student will applaud the zeal evinced by MM. Houzeau and Lancaster in undertaking to provide so valuable an addition to the literature of the science, and will cordially wish them success in every way in their self-imposed labours.

THE GREAT SOUTHERN COMET.—A private letter from Mr. Gill, H.M. Astronomer at the Cape, furnishes some particulars of his observations of the great comet up to the evening of the 9th ult. Table Mountain interfering at first with the view from the Royal Observatory, Mr. Gill proceeded to Seapoint, on the west side of the mountain, where, from the garden of Mr. H. Solomon, in which Sir Thomas Maclear observed Donati's comet in 1858, he sketched the position of the tail amongst the stars on several evenings before the nucleus had withdrawn sufficiently from the sun's place to be visible. The nucleus was first seen on February 8, and then only for a few minutes through cloud; Mr. Gill thought it might have been visible the preceding evening, but haze near the sea horizon rendered it very difficult to say where the tail ended. He describes it as "a very poor affair, a faint nebulous thing not at all worthy of so fine a tail." Attempts were made to fix its position at the Royal Observatory on February 9, but only a glimpse with an opera-glass through cloud was obtained. The nucleus was "a little N. and E. of θ Sculptoris;" in a tracing accompanying the letter in question, however, the nucleus is shown a little *south* and east of the star, and midway between two stars, which from Gould's "Uranometria Argentina," appear to be Lacaille 6 and 34, so that the place referred to the epoch of the "Uranometria," 1875·0 would be in about right ascension 2° 20′ with 37° 50′ south declination, which is far from the position given by the elements telegraphed from Rio de Janeiro (to which reference was made last week) whether the heliocentric motion be assumed direct or retrograde; probably the orbit has been vitiated in transmission. On February 6 the tail appears to have been traceable nearly to Canopus.

BIOLOGICAL NOTES

ON CERTAIN REMARKABLE PHENOMENA PRESENTED BY THE COLOURED BLOOD-CORPUSCLES OF THE FROG.—Repeated observations tend to show that the structure of the coloured blood-corpuscle is by no means so simple as is usually assumed: and from this point of view the observations made by J. Gaule in Prof. Ludwig's laboratory at Leipzig (*Archiv für Physiologie, v.* Du Bois-Reymond, 1880) are of singular interest. On diluting the fresh blood from a vigorous frog with 0·6 salt solution, and exposing it after rapid defibrination to a temperature of 32°–36° C. on the hot stage of the microscope, the escape of a peculiar body may be observed in many of the corpuscles. The bodies thus evolved simulate worms so closely by their form and wriggling movements, that Gaule styles them "Würmchen," which may be translated *vermicles*. However, he concludes from several reasons that they are simply protoplasmic portions of the corpuscles, which, under these special conditions, separate for a short independent life. He makes no reference to previous workers in the same field; but it would seem not improbable that his "Würmchen" correspond with the maculæ, which Prof. Roberts of Manchester revealed seventeen years ago by treating the corpuscles with tannin or magenta, reagents which would of course prevent any further signs of life in the objects. The "vermicles" are about half the length of the red corpuscle, pointed at either end, but more in front, and containing one or two vesicles or droplets. Their singular movements deserve a rather full description. After wriggling out of the corpuscle, in which it makes its appearance as a rod-like body beside the nucleus, the "vermicle" moves on, trailing the corpuscle behind by a long thread. On meeting a second corpuscle it bores into it, withdraws, pushes it aside, and goes on carrying this too in its train; and though the threads finally give way, "vermicles" may be seen dragging three, four, or more corpuscles after them. The corpuscles, quitted or attacked in this way, undergo in a short time changes of form and colour leading to complete disorganisation, which otherwise, under similar conditions, require hours for their accomplishment. Finally the "vermicle" also undergoes disorganisation. While the conditions given above are found on the whole most successful in bringing about these results, Gaule indicates limits of temperature and dilution within which they often occur, usually with slight modifications. It is this variation with the conditions of the experiment that supplies one of his strongest arguments against the previous individual existence of these bodies.

THE HUMAN RETINA.—In a recent note to the Vienna Academy Herr Salzer offers an estimate (based on numeration) of the probable number of optic nerve-fibres and of retinal cones in a human eye. The number of the former he supposes to be about 438,000, that of the latter 3,360,000. This gives seven or eight cones for each nerve-fibre, supposing all fibres of the optic nerve to be connected with cones, and equally distributed among them.

URAL CRAYFISH.—Part 2, vol. v. of the *Bulletin de la Société Ouralienne d'Amateurs des Sciences naturelles à Ekathérinebourg* contains a very interesting memoir on the crayfish of the rivers of the Middle and Southern Ural, by M. Malakhoff. Prof. Kessler in his fine work in the memoirs of the Russian Society of Entomology, "On the Crayfish of the Rivers of Russia" points out that the data about the life of the fluviatile crayfish are still very incomplete, and in part even contradictory, and declares that it is very desirable that new researches should fill up the one and dissipate the other. Among the queries he starts is one as to how far the crayfish have spread into the rivers of Western Siberia? in which of its rivers is it to be found? and is it true that those found are insipid as food? In this memoir, M. Malakhoff does his best to answer these, partly from personal observations, partly from those who had lived long in those parts of the country, such as fishermen, and partly from indications scattered through different works. He writes of the geographical distribution of the crayfish in the Middle and Southern Urals; giving a brief historical account of their successive propagation in the rivers of the watershed east of the Ural Mountains belonging to the basin of Western Siberia. Among the references here given, is one to a work, apparently not yet published, by J. S. Poliakoff entitled "Letters and Notices of a Journey in the Valley of the Obi." The species peculiar to this district would seem to be *Astacus leptodactylus*, Esch.; its northern limit would appear to be considerably to the north of the Ural; in the western region of the Ural it is found in many of the rivers and in considerable numbers: a detailed list of these is given. To the south it is found in the River Ural and most of its affluents. Facts seem to prove that the species is not indigenous to the eastern watershed of the Ural, nor in Northern Siberia. It would appear, however, under fitting circumstances to be very easily brought into cultivation. In the Middle and Western Ural it is to be met with from 100 to 175 mm. in length. A mountain variety possesses a cephalo-thorax, strongly serrated on the sides and angles; another, living in the River Ural, is remarkable for little asperities crowded together, which cover over the cephalo-thorax and chelæ. In the Ural the natives call the freshwater Unio Rak (*Ecrevisse*) and the true crayfish Rak-ryba (*l'Ecrevisse poisson*). Prof. Kessler's opinion as to their insipidity is declared to be wrong, as in general the crayfish are of excellent quality. In some districts they increase so much as fully to come up to the fisherman's description of "swarming;" in some rivers, owing to their number, they interfere with the capture of fish; not only will the nets be found filled with them, but what fish may be taken in these will be found spoiled and many are eaten. They will sometimes cross a good stretch of dry ground to get to a river with good feeding, though that this is a fact is denied by many. The people use the stones found in the crayfish stomachs as a remedy against struma. The distribution of *Mustela lutreola* in the Ural mountains seems to be dependent on the distribution of this crayfish, which would seem to be its principal food.—It ought to be mentioned that the memoirs of this Society are published in the original Russian, with a French translation in alternate columns.

DEVELOPMENT OF "AMBLYSTOMA PUNCTATUM."—Early in March of 1878 Dr. Samuel Clarke, of the Johns Hopkins University, obtained a mass of the eggs of the above batrachian. They were found clinging, in gelatinous, variously-sized masses, to aquatic plants, the masses containing from 4 to 200 eggs, and were partly composed of a milky, gelatinous matrix. Each egg is surrounded by two membranous shells, and the large space between these two is filled with a clear fluid. The eggs being laid by the female, the males, so far as the observations made on the animals in confinement went, then strewed the sperm-masses in the vicinity of, but not on, the ova, and not immediately on these latter being laid. Shortly afterwards, however, the eggs were found to be covered over with actively-moving spermatozoa, and though these were never actually found within even the outer shell of the eggs, yet most of those which were laid during the night were found by nine o'clock the next morning to show the first segmentation-furrows. In Dr. Clarke's paper on the development of these eggs, very minute details are given as to the results of segmentation, which are illustrated by numerous figures. The following is his own *résumé*:—after segmentation an area made up of large cells appears around the lower pole of the egg, which, at first hemispherical, then oval, and finally circular, forms the vitelline plug of Ecker. This plug protrudes from the egg, then sinks into it, while from the diminishing area around the disappearing plug stretches away the anal portions of the medullary folds with the medullary groove midway between them. The two folds grow forwards and unite near the opposite pole. The medullary folds close in and unite, forming the neural tube. The body elongates, is covered with cilia, and rotates horizontally upon its axis. The head is marked off, and the optic vesicles appear. The branchial lobes and the lobes of the cephalic balancers appear, soon followed by those of the anterior limbs. The pericardial region is marked off, and the pulsations of the heart are visible. The nasal pits and the position of the mouth are indicated. The tail and the dorsal fin grow rapidly, and the branchial lobes are divided into three pairs of branchiæ; these give off processes. The eyes develop rapidly, and the mouth is moving forward. A constriction takes place across the ventral surface of the neck, and balancers, now fully developed become capitate. The branchiæ still further develop; the balancers become more and more slender as the anterior limbs increase in length, and the blood ceasing to circulate in them, they drop off. The anterior limbs now develop rapidly; first, the first and second digits, then the third, and finally the fourth. The first two digits on the posterior limbs are formed on the fourth digits on the anterior limbs, one budding out, then the third, fourth, and fifth in succession. Up to about the sixtieth day the external parts are being gradually formed; by this date it reaches a stage, after which it undergoes no further external change beyond a general growth, until the branchiæ begin to decrease in size as they are being absorbed. This change took place in reared specimens in about one hundred days from the commencement of segmentation. The process of resorption of the branchiæ begins at their distal ends; the outer processes become shorter and disappear, until nothing is left but three pairs of small rounded processes, which are very slowly indeed absorbed. The whole of this process lasts from three to five days; they then become air-breathers, and take up their abode in damp localities on the land. Some specimens developed much more slowly; one, hatched about the middle of May, retained its branchiæ until the end of the following October. In confinement the tadpoles were hard to keep supplied with food. When hard up they would bite each other's gills off, and then begin to eat the tips of each other's tails; and even when big enough they would swallow up bodily their smaller brethren. Although endowed with an immense power of reproduction of lost parts, it seems remarkable that, once a portion of a branchial tuft was bitten off, it never, at least in hundreds of cases tried, became reproduced. In a second memoir the author promises to treat in detail of the changes that take place in the development of the internal parts.

STIMULI IN SENSITIVE NERVES.—In experiments on the rate of propagation of stimuli in sensitive nerves it has been generally assumed that, under like conditions of experiment, and with an equal length of nerve-path from the point of stimulation to the centre, the reaction time is always the same. This, tested recently by Messrs. Hall and Kries (Du Bois-Reymond's *Archiv*, 1879, Supplement, p. 1), is found to be not confirmed. Stimulating with a slight induction shock the finger point and the middle of the outer side of the upper arm, the reaction in the latter case occurred with Mr. Hall later than that from the finger (on an average about 0·005 second). In Herr von Kries, the reaction time was shorter (about 0·003 sec.) from the upper arm than from the finger. Again, the reaction time was measured when light was made to strike different parts of the retina and even here (the lengths of nerve-path being equal) presented considerable differences. In Mr. Hall's case the difference between the outer and inner part of the retina was 0·018 sec., that between the upper and lower 0·028 sec.; in Herr von Kries's the differences were respectively 0·061 and 0 064 sec. In comparison with the place of direct vision still greater differences appeared. Experiments were also made in stimulating the forehead and the tongue, in which cases the paths were assumed to be nearly equal. In both observers the reaction-time from the tongue was somewhat longer than from the forehead, though, according to Weber, the sense of space at the tip of the tongue is about twenty times finer than on the forehead. The authors conclude that the reduced reaction times differ considerably according to the place of stimulation, that in the eye the differences are connected with differences of functional power, that the reaction method is not available for ascertaining the velocity of conduction in sensitive and motor nerves, and therefore the velocity in the spinal cord is still unknown.